

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

PLUMBING THEORY N2

17 April 2015

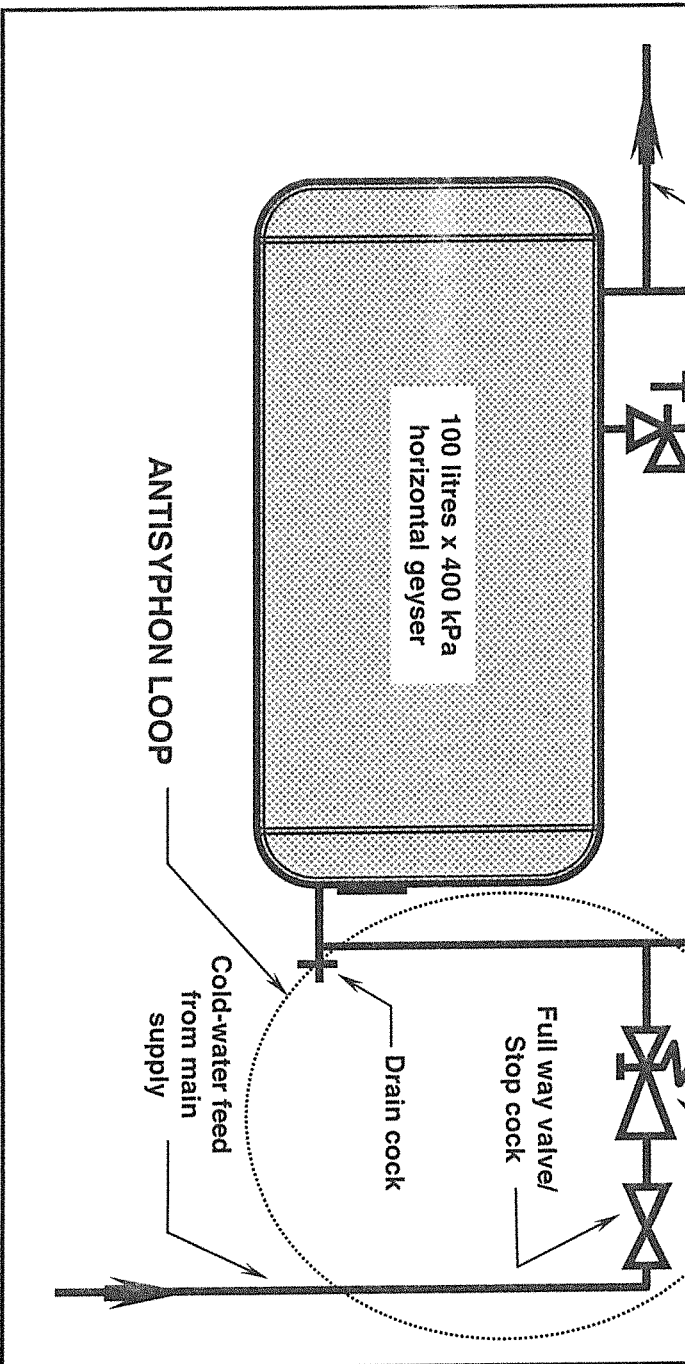
This marking guideline consists of 8 pages.

- 1.2
- Automatically expel any air in the main ✓
 - without wasting water ✓
- (2 × 1) (2)

- 1.3
- Provide water to emergency services to rinse/wash streets, etc. after accidents. ✓
 - Provide access to fill municipal water tankers. ✓
 - Provide access to municipal workers to use water off a metered standpipe ✓
 - To be used as a temporary connection with approval by city engineers ✓.
- (Any 3 × 1) (3)

- 1.4
- This system is more economical as far as installation costs, operating costs and maintenance costs are concerned. ✓
 - This system is more reliable and ensures a much more constant supply. The pump in a pump system must be interrupted to maintain or repair pumps. ✓
 - A more constant pressure is ensured. The only fluctuations of pressure at terminal fittings will occur at peak demands and changes of the water level in the service reservoir. ✓
- (3 × 1) (3)

- 1.5
- Boiling the water also releases the carbon dioxide ✓ and the salts are precipitated. ✓ This causes 'furring' (scaling) of hot-water systems. ✓
 - This causes blockages ✓ of hot-water systems and also leads to wastage ✓ of heat energy. ✓
- (6)
[20]



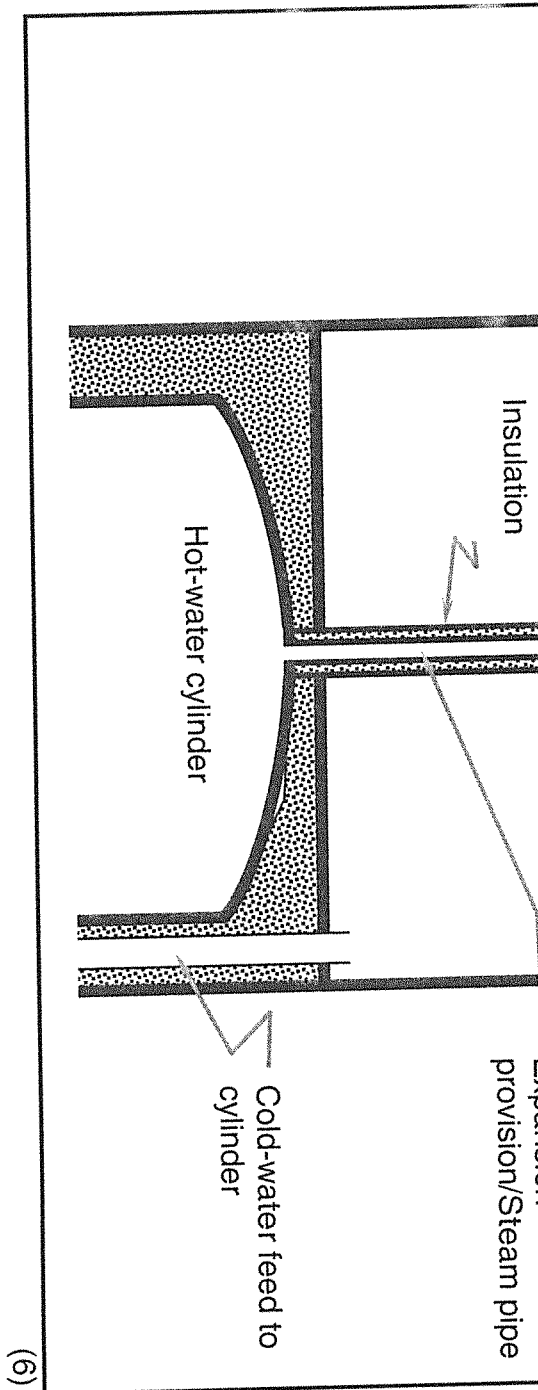
(7)

2.2

- If the system heats up (boils) temporary hard water, the carbon dioxide is driven off and ✓
- the bicarbonates of calcium and/or magnesium are thus not held in solution any more. ✓
- These salts then precipitate in the system and ✓
- settle to form the 'scaling'. ✓

(Any 3 × 1)

(3)



(6)

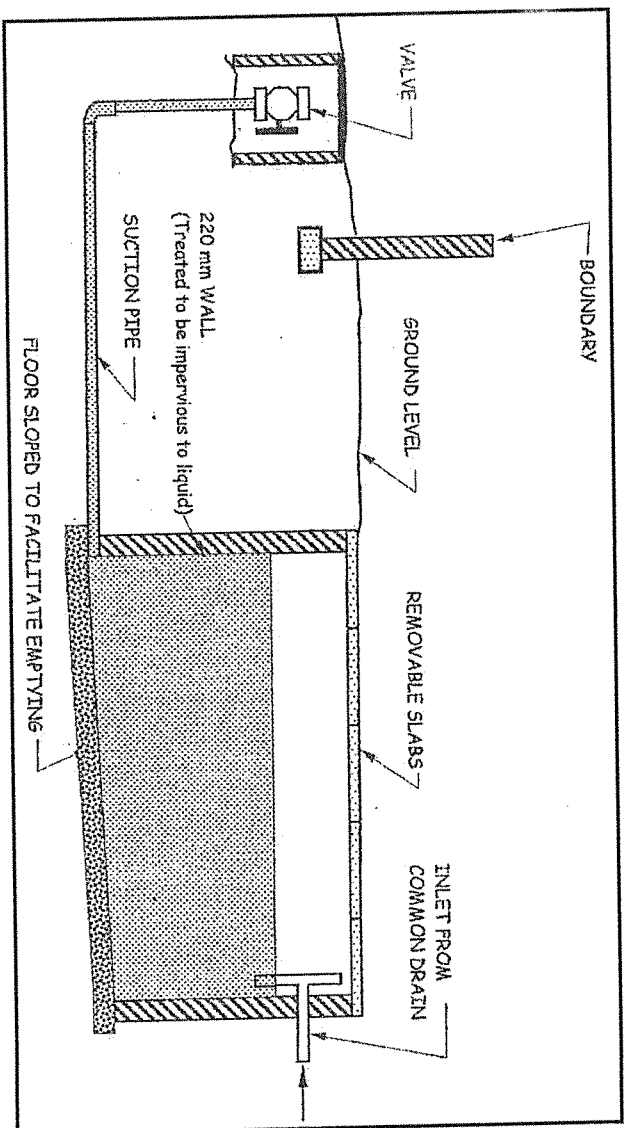
- 2.4
- Reduce the incoming mains pressure ✓
 - to a pre-set pressure rating ✓
 - and maintain ✓
 - and control this pressure ✓
 - when the system is not in use ✓.

(Any 4 × 1)

(4)
[20]

QUESTION 3: DRAINAGE

- 3.1 3.1.1 • A drainage installation of a site is vested in the owner of the site ✓
- It is intended for the reception, conveyance, storage or treatment of sewage. ✓
 - This includes sanitary fixtures, traps, discharge pipes, drains, ventilation pipes, septic tanks, sewage treatment works and mechanical appliances associated therewith. ✓
- (3 × 1) (3)
- 3.1.2 • A rodding eye is a permanent access opening to the interior of a drainage installation that ✓
- permits full bore access to the interior of a drain for internal cleaning. ✓
- (2 × 1) (2)



(6)

3.3 Fall = Distance × Gradient

$$= 12,75 \times \frac{1}{26}$$

$$= 490,4 \text{ mm}$$

✓✓

Invert Depth = Invert Depth_{HEAD} + Fall

$$= 625 + 490,4$$

$$= 1\,115,4 \text{ mm}$$

✓✓

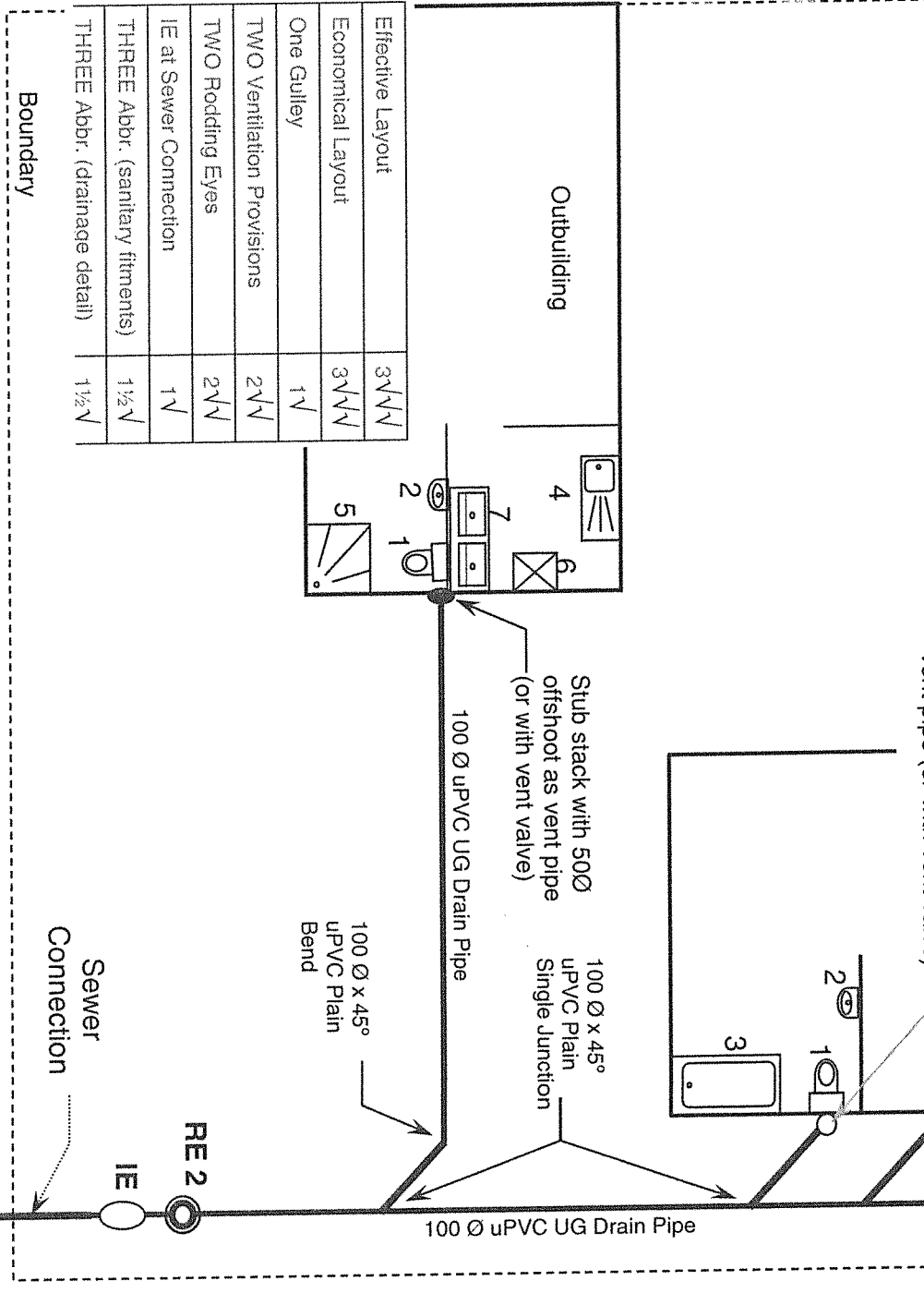
OR

Fall = $\frac{\text{Distance of drain (m)}}{\text{gradient}}$

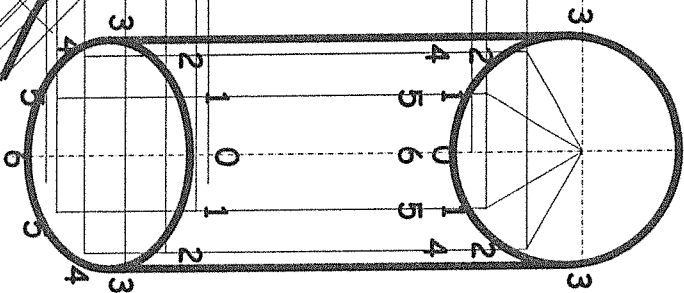
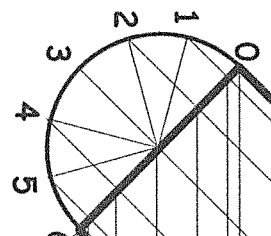
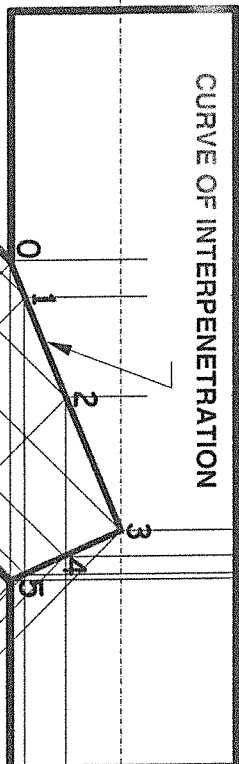
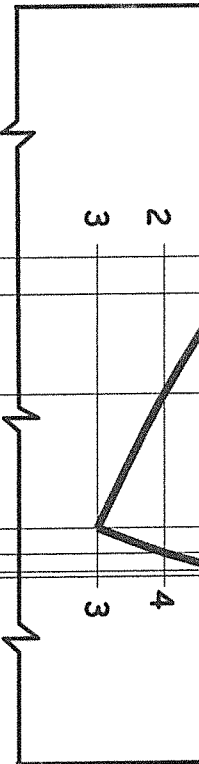
$$= \frac{12,75}{26}$$

$$= 490,4 \text{ mm}$$

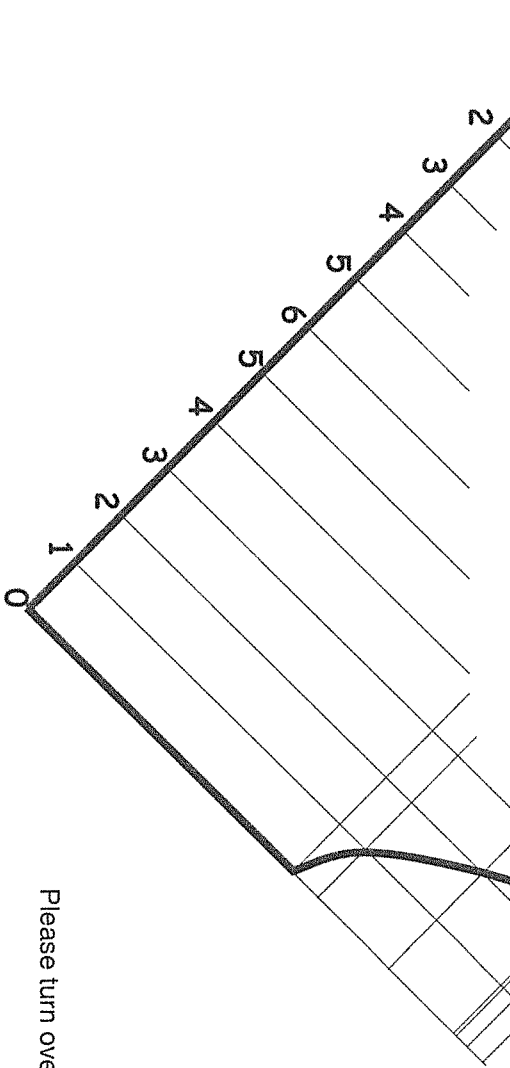
(4)



(15)
[35]



PATTERN OF BRANCH PIPE



SCALE 1 : 10

[15]

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Please turn over

$$\begin{aligned}
 \text{MASS}_{\text{TOTAL}} &= m_{\text{TANK}} + m_{\text{WATER}} \\
 &= (D \times V \times g) + 250 \\
 &= (1000 \times 1,008 \times 10) + 250 \\
 &= 10\,080 + 250 \\
 &= 10\,330 \text{ kg}
 \end{aligned}$$

(4)

5.1.3



$$\begin{aligned}
 \text{AREA}_{\text{TOTAL}} &= A_{\text{BASE}} + A_{\text{SIDES}} \\
 &= (1,2 \times 1,2) + 4(1,2 \times 0,9) \\
 &= 1,44 + (4 \times 1,08) \\
 &= 1,44 + 4,32 \\
 &= 5,76 \text{ m}^2
 \end{aligned}$$

(3)
[10]

TOTAL: 100